

EXECUTIVE SUMMARY

This Work Plan summarizes both recent and future investigative and planned remedial activities at Operable Unit 2 (OU2), Hill Air Force Base, Utah. The principal objective of this Work Plan is to provide the reader with a detailed guide to the activities that are to take place under the present delivery order to Radian International LLC and, by subcontract, to Duke Engineering & Services. These activities are directed to the in-situ recovery and ex-situ treatment of the chlorinated degreasing solvents present in the alluvial aquifer beneath OU2 as dense non-aqueous phase liquid (DNAPL).

The reader is alerted to the fact that two separate areas of OU2 are considered in this Work Plan. To date, this delivery order has provided site characterization data only for that part of the OU2 aquifer that has been isolated outside the containment wall surrounding most of the DNAPL source at OU2. This isolated part of the aquifer is thought to contain 5,000 to 10,000 gallons of chlorinated degreasing solvents. It is identified in the Work Plan as the "Griffith Pool" or, more formally, as Panel 5 because the four zones of the OU2 aquifer contained within the containment wall are known as Panels 1 through 4. However, this Work Plan also includes an outline of the design program for the surfactant-enhanced aquifer remediation (SEAR) of the OU2 aquifer to be initiated with a surfactant flood in Panel 1.

The preliminary site characterization work already completed in the Griffith Pool panel of the aquifer is summarized in Section 2 of the Work Plan. The preliminary work has revealed that, while dissolved contamination is leaving the Griffith Pool via a subsurface spillway within the alluvium and being transported by ground water down the hillside towards South Weber Drive, no DNAPL is present in the spillway itself. The DNAPL is confined to a stratigraphic trap at the juncture of the Provo alluvium and the Alpine clay that is similar to the other stratigraphic traps inside the containment wall.

The preliminary design and field determination of the exact volume of DNAPL in the Griffith Pool by a partitioning interwell tracer test [PITT] is addressed in Section 3. The optimum location of injection, extraction and monitor wells has been investigated by a design program that employed ground-water flow (MODFLOW), particle tracking (MODPATH), and multi-phase (UTCHEM) simulators. The criteria incorporated in the design of the Griffith Pool well field stipulate that not only should the well field provide containment of the solvent contamination during injection-extraction operations but also it should permit an efficient and complete sweep of the DNAPL zone.

The installation of the Griffith Pool well field and the completion of a pipeline and other surface facilities to integrate the well field with the Source Recovery System (SRS), which is the main Hill AFB treatment plant for chlorinated degreasing solvents, are discussed in Section 4. In addition, the extraction of free-phase DNAPL from and the hydraulic testing of the Griffith Pool aquifer sediments are described in Section 4. This section concludes with a discussion of the steps in the final design of and preparation for the PITT in the Griffith Pool that is to be conducted in the Spring of 1999.

Section 5 changes the focus of the Work Plan from tracer testing of the Griffith Pool to surfactant flooding of Panel 1 within the containment wall. An earlier delivery order managed by AFCEE for Hill AFB has provided for the characterization of the four panels within the slurry wall by a sequence of PITTs that will be completed by URS-Greiner and DE&S in November 1998. The first of these panels is to undergo SEAR as the final task in the present delivery order awarded to the Radian-DE&S team. Because of much confusion and misinformation that is circulating in environmental journals about SEAR, Section 5 presents an in-depth discussion of the technology of SEAR. This includes the necessity and methods of control of the surfactant flood to ensure a complete and efficient sweep of the DNAPL zone (Section 5.1), the laboratory tests that support the design of the flood (Section 5.2), and the design of the flood itself using the UTCHEM simulator (Section 5.3). A final PITT and then confirmation borings to assess the performance of SEAR at OU2 will immediately follow the surfactant flood.

In summary, the Work Plan describes a sequence of tasks that will complete the characterization of the DNAPL zone within the alluvial aquifer at OU2. This will necessitate the installation of a well field and pipeline system to connect and integrate the Griffith Pool well field with the SRS. The SRS itself will be modified to allow for improved handling and treatment of the tracer and surfactant effluents. Finally, the Work Plan addresses the task of the full-scale DNAPL removal from the alluvial aquifer by SEAR and its performance assessment. This full-scale DNAPL removal by SEAR, which is described herein, will be the first of its kind in the USA.